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METALLOBERFLÄCHE, vol. 38, no. 2, February 1984,  
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"Aktivieren mit kolloidalem Palladium beim  
Galvanisieren von ABS-Pfropfpolymeren"

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## Description

The present invention is concerned with a process for accelerating Pd/Sn seeds for electroless copper plating.

The use of Pd/Sn seeds for electroless copper plating is well known. US-A-3,011,920 describes a process to produce seeds which are colloidal particles protected by a coating containing a large amount of tin. The patent describes methods for accelerating such seeds by treatment with a whole range of reagents, including acids, sodium carbonate, sodium pyrophosphate, or sodium hydroxide at a concentration of 5% (see column 5, line 39). The suggested treatment with 5% sodium hydroxide makes no mention at all of temperature.

In currently used commercial production, acceleration of the Pd/Sn seeds is often accomplished by treatment with hydrochloric acid.

According to the present invention, Pd/Sn seeds for use in electroless copper plating are accelerated by a process comprising treating them with an aqueous solution of an alkali metal hydroxide at a pH of about 11.3 and at a temperature of above 50°C. Such a treatment selectively removes tin from the surfaces of the seeds while leaving the palladium. This is in sharp contrast to the results obtained using 5% sodium hydroxide as taught by US-A-3,011,920. When the latter process is used, tin still remains a major component of the surface layer of the seeds. The presence of tin on the surface is very undesirable, because it serves to decrease the activity of the seeds, and because it also serves as a source of tin to contaminate the plating bath subsequently used during the electroless deposition of copper. It should be noted that acceleration treatment with hydrochloric acid, as is most commonly done commercially at present, likewise results in seeds still having a large amount of tin on the surface.

Pd/Sn seeds typically have a surface having a Pd/Sn ratio of approximately 1 to 5. After acceleration with hydrochloric acid, as is currently used commercially, the Pd/Sn surface ratio is approximately 1 to 2, i.e. Sn is still the major component and the 'acceleration' is at best only partially effective. By the process of the present invention, however, there are obtained treated seeds having a Pd/Sn ratio of 5 to 1.

Electroless copper plating is a process of very great importance in, for example, the manufacture of circuit boards. Typically, circuit boards are made of resin, i.e. an epoxy resin. The process of the present invention is particularly advantageous when used for the treatment of seeds on such a substrate.

It must be emphasised that the alkali metal hydroxide solutions used in the present invention have a pH about 11.3 i.e. they are quite weakly basic. Sodium hydroxide is the preferred alkali metal hydroxide and it is present at a concentration of approximately 0.005%, i.e. a concentration only one part in a thousandth of that mentioned in US-A-3,011,920.

In the process of the present invention, it is es-

sential that the seeds are treated at a temperature above 50°C. The preferred temperature is about 73°C. This is in sharp contrast to US-A-3,011,920 which does not specify any temperature for the treatment.

## Claims

1. A process for accelerating Pd/Sn seeds for electroless copper plating, the process comprising treating the seeds with an aqueous solution of alkali metal hydroxide at a pH of about 11.3 and at a temperature of above 50°C, thereby reducing the proportion of Sn in the surface layer of the seeds.

2. A process as claimed in claim 1, wherein the aqueous metal alkali hydroxide is sodium hydroxide.

3. A process as claimed in claim 2, wherein the sodium hydroxide is in a concentration of about 0.005%.

4. A process as claimed in any preceding claim, which is performed at a temperature of 73°C.

5. A process as claimed in any preceding claim, which is performed on Pd/Sn seeds disposed on an epoxy resin substrate.

## Patentansprüche

1. Verfahren für die Aktivierung der Pd/Sn-Keime für die stromlose Verkupferung, dadurch gekennzeichnet, daß die Keime mit einer wässrigen Lösung aus Alkali-Metall-Hydroxid mit einem pH-Wert von ca. 11,3 und bei einer Temperatur von mehr als 50°C behandelt werden, wodurch das Verhältnis von Sn in der Oberflächenschicht der Keime verringert wird.

2. Verfahren nach Anspruch 1, dadurch gekennzeichnet, daß das wässrige Metall-Alkali-Hydroxid Natriumhydroxid ist.

3. Verfahren nach Anspruch 2, dadurch gekennzeichnet, daß das Natriumhydroxid eine Konzentration von ca. 0,005% aufweist.

4. Verfahren nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß es bei einer Temperatur von 73°C durchgeführt wird.

5. Verfahren nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß es auf Pd/Sn-Keimen durchgeführt wird, welche auf einem Epoxidharz-Substrat abgelegt sind.

## Revendications

1. Procédé pour l'activation des germes Pd/Sn pour un culvage chimique, lequel procédé comprend le traitement des germes avec une solution aqueuse d'un hydroxyde d'un métal alcalin, à pH d'environ 11,3 et à une température supérieure à 50°C, ce qui réduit la proportion de Sn dans la couche superficielle des germes.

2. Procédé tel que revendiqué dans la revendication 1, dans lequel l'hydroxyde de métal alcalin en solution aqueuse est de l'hydroxyde de sodium.

3. Procédé tel que revendiqué dans la revendication 2, dans lequel l'hydroxyde de sodium se trouve à une concentration d'environ 0,005%.

4. Procédé tel que revendiqué dans l'une quel-

conque des revendications précédentes, qui est effectué à une température de 73°C.

5. Procédé tel que revendiqué dans l'une quelconque des revendications précédentes, qui est effectué sur des germes Pd/Sn disposés sur un substrat de résine époxyde.

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